

*Subs*

We claim:

1. A method for obtaining a transgenic embryo, comprising the steps of:  
co-inserting an exogenous nucleic acid and a membrane-disrupted sperm head or  
a demembranated sperm head into an unfertilized oocyte to form a transgenic fertilized  
oocyte; and  
allowing the transgenic fertilized oocyte to develop into a transgenic embryo.
2. The method of claim 1, wherein the coinserting step is accomplished by piezo-  
electrically actuated microinjection.
3. The method of claim 2, wherein the exogenous nucleic acid and the membrane-disrupted  
sperm head are coinjected into the cytoplasm of the unfertilized oocyte.
4. The method of claim 1, wherein the membrane-disrupted sperm head is obtained from  
a spermatozoon that has been frozen and thawed.
5. The method of claim 1, wherein the membrane-disrupted sperm head is obtained from  
a rehydrated freeze-dried spermatozoon.
6. The method of claim 1, wherein the sperm head is a demembranated head comprising the  
nucleus and perinuclear materials.
7. The method of claim 6, wherein the membrane-disrupted sperm head is obtained from  
a detergent-treated spermatozoon.
8. The method of claim 1, wherein the unfertilized oocyte is a metaphase II oocyte.
9. The method of claim 1, wherein the coinserting step comprises the substep of  
~~preincubating~~ the membrane-disrupted or demembranated sperm head with the  
exogenous nucleic acid for a first time period.

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10. The method of claim 9, wherein the first time period is about 30 seconds to about 5 minutes.
11. The method of claim 10, wherein the first time period is about 45 seconds to about 3 minutes.
12. The method of claim 11, wherein the first time period is about 1 minute to about 2 minutes.

*Sub A* 12

13. The method of claim 1, wherein the exogenous nucleic acid comprises more than one transgene.

*Sub A* 13

14. The method of claim 1, further comprising the step of allowing the transgenic embryo to develop into a live offspring.

*Sub A* 14

15. The method of claim 14, wherein the allowing step comprises the substep of transplanting the transgenic embryo into a surrogate mother.

*Sub A* 3

16. The method of claim 1, wherein the oocyte and the sperm head are from a mammal..

*Sub A* 15

17. The method of claim 15, wherein the mammal is selected from the group consisting of primates, ovines, bovines, porcines, ursines, felines, canines, equines and rodents.

*Sub A* 17

18. The method of claim 1, wherein the oocyte and the sperm head are from an invertebrate.

*Sub A* 19

19. The method of claim 1, wherein the oocyte and the sperm head are from a fish, an amphibian, a reptile or a bird.

*Sub A* 19

20. The method of claim 1, wherein the oocyte and the sperm head are from a sea urchin, a lobster, an abalone, or a shellfish.

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21. A method for obtaining a transgenic embryo, comprising the steps of:  
obtaining a membrane-disrupted sperm head or a demembranated sperm head;  
mixing the membrane-disrupted sperm head or demembranated sperm head with  
an exogenous nucleic acid containing a desired gene,  
coinjecting the mixture into an isolated unfertilized metaphase II oocyte to form  
a transgenic fertilized oocyte; and  
allowing the transgenic fertilized oocyte to develop into a transgenic embryo.